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Abstract

Impact of Soil Water Stress at Seed Development Stage on Phenology, Fecundity and Seed Dormancy of *Avena sterilis* ssp. *ludoviciana* †

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Abstract: Wild oat (*Avena sterilis* ssp. *ludoviciana* (Durieu) Nyman) is considered the most difficult-to-control winter weed in the northern grain region (NGR) of Australia particularly following the adoption of no-till conservation agriculture and the enhanced reliance on herbicides for weed control. A diversity of survival mechanisms is responsible for its persistence in no-till conservation cropping. Among them long-term, variable seed dormancy is the most important. A number of environmental stresses (for example drought) are known to affect the seed dormancy status. We hypothesized that the increasing frequency of hot and dry period in late winter/early spring season in the NGR might help to mature and shed less dormant wild oat seeds before the wheat crop is harvested. This early shedding of highly germinable seed better aids persistence in no-till conservation cropping systems. Our research showed that soil water stress applied at seed development stage resulted in lower number (16–22% less) of early maturing (5–20 days earlier) less dormant (28% less) seeds compared with control plants. This observation was made for a number of biotypes either coming from within one location or between locations within the NGR. Thus, the frequent hot and dry period at the time of seed development in the NGR is responsible for production of less dormant *Avena sterilis* ssp. *ludoviciana* seeds where no-till conservation cropping is helping to retain these seeds on the top soil. Under favourable germination conditions in the following season these less dormant seeds will immediately be available to re-infest the autumn/winter-sown wheat crop.

Keywords: wild oat; soil water stress; seed dormancy; no-till conservation agriculture; winter crop

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